REMARKS

Specification

The specification including the abstract has been objected to under 35 USC §112, first paragraph, for containing informalities. A substitute specification (a marked up copy and a clean copy) is provided to correct the informalities. No new matter has been added.

Claim Rejections – 35 USC §112

Claims 1-6 have been rejected as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regards as the invention. Claims 1-6 have been amended herein to correct the indefiniteness. No new matter has been added. Withdrawal of this rejection is respectfully requested.

Claim 6 has been amended into independent form.

Claim Rejections – 35 USC §102

Claims 1, 2, and 4 have been rejected under 35 USC §102(b) as being anticipated by US patent No. 5,003,192 to Beigel. However, Applicants submit that the claims 1, 2, and 4 as amended are not anticipated by Beigel.

Claim 1 as amended reads:

> 1. (currently amended) A power on/off circuit apparatus, comprising:
> **a power on/off circuit for controlling an on/off supply of power to electronic components from an external power source;**
> **a microcomputer connected to the power on/off circuit** for controlling said power on/off circuit based on an operation input of a power switch;
> a reset circuit for giving a reset signal to a reset terminal of the microcomputer when a power is supplied to said microcomputer; and
> a non-volatile memory for storing power on/off information just before said power switch is operated, **the power on/off circuit connected to the non-volatile memory** for controlling the on/off supply of power to the non-volatile memory, and said power switch being connected to said reset terminal.

The above bolded features are not disclosed, taught, or suggested by the cited prior art, Beigel. In the office action, a power on/off circuit is equated to the control circuit 40 in Fig. 3 of Beigel. It is clear from Fig. 3 that the control circuit 40 represents an entire circuit that includes the

logic section 54 (equated to the microcomputer), the power interrupt sensor 45 (equated to the reset circuit), and the EEPROMs 50, (equated to the non-volatile memory). The power on/off circuit of claim 1 clearly does not correspond or is not equivalent to the control circuit 40 of Beigel. The power on/off circuit is an element of the power on/off circuit apparatus and does not include the microcomputer, the reset circuit, or the non-volatile memory. As it is clear from claim 1, the power on/off circuit is separately connected to the microcomputer and the non-volatile memory. At least for the above reason, claim 1 is not anticipated by Beigel.

Claims 2 and 4 depend from claim 1, and therefore, are not anticipated by Beigel at least for the same reason as claim 1.

Applicants further submit that other independent claims, claim 6 and 8, having similar features as claim 1 are also not anticipated by Beigel for the same reasons as claim 1.

Claim Rejections – 35 USC 103

Claims 3 and 5 have been rejected as being unpatentable over US Patent No. 5,003,192 to Beigel, in view of US Patent No. 6,625,739 to Kobayashi. However, Applicants submit that claims 3 and 5 are patentable over the cited prior art references at least for the following reasons.

Claims 3 and 5 depend from claim 1, and claim 1 has been shown not to be anticipated by Beigel. Thus, claims 3 and 5 are not disclosed, taught, or suggested by Beigel in view of Kobayashi as claim 1.

It is pointed out that Kobayashi teaches a power supply controller 47. However, this controller 47 is used to turn off the power to the computer (column 8, lines 36 to 39). The power on/off circuit, on the other hand, controls supply of power to components within the power on/off circuit apparatus. Thus, clearly the power supply controller 47 of Kobayashi is different from the power on/off circuit of the present invention.

New Claims

Claims 7 and 8 have been added to include a servo circuit and an AV decoder circuit. The elements are disclosed in the specification. No new matter has been added. Neither Beigel or Kobashi discloses, teaches, or suggests the above elements.

Claims 9 to 11 have been added to include a second power on/off circuit. The elements are disclosed in the specification. No new matter has been added. Neither Beigel or Kobashi discloses, teaches, or suggests the above element.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

Dated: June 21, 2004

Respectfully submitted,

By _____

Chris T. Mizumoto
Registration No.: 42,899
DARBY & DARBY P.C.
P.O. Box 5257
New York, New York 10150-5257
(212) 527-7700
(212) 753-6237 (Fax)
Attorneys/Agents For Applicant

MARKED-UP SPECIFICATION

POWER ON/OFF CIRCUIT APPARATUS HAVING A RESET FUNCTION

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a power on/off circuit apparatus, which can turn on/off a power supply from an external power source to each electronic deviceequipment based on an operation input of power switch, in electronic equipmentsdevices including a microcomputer.

2. Description of the Related Art

Conventionally, in electronic equipmentsdevices such as a DVD (digital video disc) player, a DVD-ROM (digital video disc-read only memory) drive and the like, when these equipmentsdevices are connected to an AC (alternating current) power source, a power is always supplied to a microcomputer. The microcomputer carries out a key scan sensing operation of a key matrix on which various input keys including a power switch are arranged, and then, makes an on/off control of power supply to individual electronic equipmentscomponents when the power switch is operated.

Moreover, even when the power supplied to individual electronic equipmentscomponents is turned off, the microcomputer is operating; in other words, these electronic equipmentscomponents are operating in a power saving mode (key scan sensing operation is still continuing).

By the way, when the microcomputer hangs up due to any factors, key scan sensing operation is impossible, and even when the power switch is operated, the power of the these

~~equipments~~components is not turned off. For this reason, an AC code must be plugged out and in of a receptacle (plug socket) in order to cancel the above hang-up of the microcomputer.

In the case where the microcomputer makes a malfunction, there is a well-known technique of resetting the microcomputer without plugging the AC code out of the receptacle (e.g., refer to Japanese Unexamined Utility Model Publication No. SHO 57-204592).

However, according to the prior art disclosed in the above Publication, in the case where the microcomputer is reset by the power switch making a malfunction, the state of electronic ~~equipments~~components operating just before is lost; for this reason, a user must start the operation of electronic ~~equipments~~components at the beginning. Therefore, the user has a misunderstanding of making a power-on operation in spite of making a power-off operation from the power-on state by operating the power switch; as a result, the user has a strange feeling that something is wrong. Moreover, the electronic ~~equipments~~components are not operating in a power saving mode (key scan sensing operation is still continuing).

SUMMARY OF THE INVENTION

The present invention has been made in order to solve the above problems in the prior art. It is, therefore, an object of the present invention to offer a power on/off circuit apparatus, which can reset a microcomputer by a power switch without plugging an AC code out of a receptacle when the microcomputer makes a malfunction, and can memorize an operating state of ~~equipments~~components just before reset so as to start operating from the state before reset without a strange feeling.

In order to achieve the above object, according to one aspect, the present invention provides a power on/off circuit apparatus, comprising:

a power on/off circuit for controlling an on/off of power supply to electronic ~~equipments~~components from an external power source;

a microcomputer for controlling the power on/off circuit based on an operation input of a power switch,

a reset circuit for giving a reset signal to a reset terminal of the microcomputer when a power is supplied to the microcomputer; and

a non-volatile memory for storing a power on/off information just before the power switch is operated,

the power switch being connected to the reset terminal.

With the above construction, the microcomputer controls the power on/off circuit based on an operation input of the power switch, and carries out an on/off control of power supply to electronic ~~equipments~~components from an external power source.

In the case where the microcomputer runs away, when the on/off operation of the power switch is carried out, the microcomputer is reset, and further, an operating state of ~~equipments~~components just before the power switch is operated is stored in the non-volatile memory. Therefore, it is possible to transfer the ~~equipments~~components from a state of the equipment just before the operation to the next operation.

Moreover, preferably, when the power switch is operated, the microcomputer reads a power on/off information of the non-volatile memory so as to determine a power on/off state just before the power switch is operated, and writes a power-on information to the non-volatile memory while making a power-on operation if the microcomputer is in a power-off state. Further, the microcomputer writes a power-off information to the non-volatile memory while making a power-off operation if the microcomputer is in a power-on state.

By doing so, in the case where the state just before the power switch is operated is a power-on state, the microcomputer enters a power-off state.

Moreover, the power on/off circuit apparatus further includes a power circuit connected to an AC power source, and the power on/off circuit uses an output of the power circuit as a power source.

The microcomputer uses an output of the power circuit as a power source, and senses a key scan of a key matrix on which various input keys except the power switch are arranged, regardless of the on/off of power supply to electronic ~~equipments~~components by the power on/off circuit. By doing so, so long as the power circuit is connected to the AC power source, even if the power supply to electronic ~~equipments~~components is in an off state, the microcomputer is in a state capable of sensing a key scan~~, what is called,~~ in a power saving mode.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a view showing an example using an electronic ~~equipments~~device including a power on/off circuit apparatus according to one embodiment of the present invention;

FIG. 2 is a circuit diagram showing a configuration of the power on/off circuit apparatus;

FIG. 3 is a flowchart in the power on/off circuit apparatus; and

FIG. 4 is a view partially showing a conventional power on/off circuit apparatus. PREFERRED EMBODIMENT OF

SUMMARY OF THE INVENTION

One preferred embodiment of a power on/off circuit apparatus according to the present invention will be detailedly described below with reference to the accompanying drawings. FIG. 1 is a view showing an example using a DVD player (one of electronic ~~equipments~~devices) including a power on/off circuit apparatus, and FIG. 2 is a circuit diagram showing a configuration of the power on/off circuit apparatus. The DVD player 1 has an AC input 10, a power switch 3,

and a reproduction output terminal is connected to a color TV 2. The power on/off circuit apparatus includes a microcomputer 4, a reset circuit 5, and power on/off circuits 6 and 7.

More specifically, the microcomputer 4 controls a predetermined operation based on various input key detection, and the reset circuit 5 gives a reset signal to a reset terminal RST of the microcomputer 5, and further, the power on/off circuits 6 and 7 turn on and off the power supply to each section of the DVD player.

The microcomputer 4 senses (detects) a key scan of a key matrix 8 on which various input keys except the power switch 3 are arranged, and further, controls an on/off control of the power on/off circuits 6 and 7 in accordance with the operation input of the power switch 3 (power control).

The power switch 3 is connected to the reset terminal RST, and then, short-circuits the reset terminal RST to GDN when being depressed.

A power circuit 11 receives a power supply from the AC input 10 comprising an AC code connected to an external AC power receptacle, and then, an output of the power circuit 11 is generated as a direct current power source by a rectifier circuit 12.

Further, the power on/off circuits 6 and 7 is connected to the direct current power source, and then, when the power on/off circuit 6 is turned on, a digital power 13 is supplied.

The digital power 13 is connected with an E2 PROM (non-volatile memory) 14, a servo circuit 15, an AV decode circuit 16, and other ~~equipments~~components (e.g., 5.5V line).

The power on/off circuit 7 is a circuit equal to the above power on/off circuit 6, and supplies a digital power to other ~~equipments~~components (e.g., 3.3V line).

In addition, the above direct current power source is used as a power source of the reset circuit 5 and the microcomputer 4.

The E2PROM 14 is provided with a register for storing a parental lock data, which is one of DVD player functions and stop memory information, and a power on/off information just before the power switch 3 is operated. The microcomputer 4 carries out information write and read with respect to the E2PROM 14.

The procedure of the operation made by the microcomputer 4 in the above configuration will be described below with reference to a flowchart of FIG. 3

The AC input 10 (AC code) is plugged into the AC power source receptacle (#1) so as to turn on the power
of the microcomputer 4 (#2).

By doing so, the reset circuit 5 is operated (#3), and then, the microcomputer 4 is initialized (#4).

The microcomputer 4 reads power on/off register information of the E2 PROM 14 (#5), and then, determines whether or ~~mot~~not -a register value is power-on (e.g., 1010).

Unless the register value is power-on (NO in step #6), the power-on information (1010) is written in the power on/off register of the E2 PROM 14 (#9), and further, a power-on operation is carried out (#10).

By the power-on operation, the microcomputer enters a power-on state, if the operation state just before the power switch 3 is operated is a power-off state.

On the other hand, if the register value is power-on (YES in step #6), the power-off information (0000) is written in the power on/off register of the E2PROM 14 (#7), and further, a power-off

operation is carried out (#8). By the power-off operation, the microcomputer enters a power-on state, if the operation state just before the power switch 3 is operated is a power-on state.

In this case, the above power-on operation in steps #10 and #8 is equivalent to the power control with respect to the power on/off circuit 6.

Now, in the case where the microcomputer 4 hangs up due to any factors during the operation of ~~equipments~~components, in order to cancel the hang-up, the power switch 3 is depressed (#13).

By doing so, an interruption enters the step #3, and then, the reset circuit 5 is operated so as to reset the microcomputer 4, and thereafter, the procedure same as above is carried out. In order to make a comparison with the present invention, a conventional power on/off circuit apparatus will be described below with reference to FIG. 4.

In the conventional power on/off circuit apparatus, a power switch 3a is provided on the key matrix 8 of the microcomputer 4. For this reason, when the microcomputer 4 hangs up, key scan sensing operation is impossible; as a result, even when depressing the power switch 3a, the microcomputer is still hanging up.

In order to cancel the hang-up of the microcomputer 4, there is no other way of plugging the AC code out and in of the receptacle.

On the contrary, according to the present invention, as shown in FIG. 2, the power switch 3 is not provided on the key matrix 8, and provided on the reset terminal RST of the microcomputer 4; therefore, it is possible to solve the above problem in the prior art.

Moreover, the microcomputer 4 is, regardless of the power supply of equipment a power on/off circuit 6 turned on or off, in a state capable of sensing a key scan of the key matrix 8 on which various input keys except the power switch 3 are arranged; therefore, electronic ~~equipments~~components are operating in a ~~so-called~~ power saving mode.